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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,182	04/08/2004	Tsutomu Sato	04329.3299	7391
22852	7590	04/14/2006	EXAMINER	
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413			WILSON, ALLAN R	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 04/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/820,182

Applicant(s)

SATO ET AL.

Examiner

Allan R. Wilson

Art Unit

2815

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 4-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0404, 0504, 0804.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 4, 5 and 15 are objected to because of the following informalities:

Claim 4 recites the limitation “the bottom gate electrode and the bottom gate insulating film” in lines 3 and 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 5 recites the limitation “the side gate insulating film and the side gate electrode” in lines 4 and 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 depends on claims 4 and 5, this is confusing since claim 5 already depends on claim 4. Additionally, it is confusing if “a bottom gate insulating film and a bottom gate electrode” is the same as in claim 4 or a second insulating film and electrode.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 are rejected under 35 USC § 102(b) as being anticipated by U.S. Patent No. 5,498,891 to Sato.

With regards to claim 1, Sato illustrates in figures 6-16 (entire document), particularly figure 6, a semiconductor substrate 1; a MOSFET including a double gate structure 3 and 5

Art Unit: 2815

provided on the semiconductor substrate; and an isolation region 2 and 21 for isolating the MOSFET from other elements comprising a trench provided on the surface of the semiconductor substrate and an insulator provided in the trench, the isolation region having a region 21 in the trench around the MOSFET, the region having a deeper bottom than other regions in the trench.

Regarding claim 2, the MOSFET comprises: a bottom gate electrode 3 provided in the semiconductor substrate; a top gate electrode 5 provided on the semiconductor substrate above the bottom gate electrode; a top gate insulating film 4 provided between the top gate electrode and the semiconductor substrate; and a bottom gate insulating film 8 provided between the semiconductor substrate below the top gate electrode and the bottom gate electrode.

Regarding claim 3, the MOSFET further comprises a side gate electrode (5 in the center) and a side gate insulating film (4 in the center) which are provided in the region having the deeper bottom 21 than the other regions in the trench 2 around the MOSFET, and a part of the insulator is provided in the region having the deeper bottom than the other regions under the side gate electrode.

***Allowable Subject Matter***

Claims 4-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, with the objections to claims 4, 5 and 15 are overcome.

The following is an examiner's statement of reasons for allowance:

A close prior art, Sato, discloses most of the limitations of the claims, but fails to show at least a bottom gate electrode and a bottom gate insulating film in an empty space.


### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:, Zombrano, Nakagawa, Kim et al. and Cavins et al.

Any inquiry concerning this communication or earlier communications from an examiner should be directed to Primary Examiner Allan Wilson whose telephone number is (571) 272-1738. Examiner Wilson can normally be reached 6:00-4:30 Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Allan R. Wilson  
Primary Examiner  
April 11, 2006